

GERGANA G. NESTOROVA, PhD
Assistant Professor of Biological Sciences
MSNT Program Chair
Louisiana Tech University
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EDUCATION

- Ph.D. Molecular Sciences and Nanotechnology, Louisiana Tech University** August 2014
Dissertation: “*Thermoelectric Method for Performing ELISA*”.
- B.S. Biology, Coastal Carolina University** August 2006

EXPERIENCE

Louisiana Tech University, Ruston, LA

MSNT Program Chair, September 2017-current
Assistant Professor of Biological Sciences, September 2016-current
MSNT Program Coordinator, September 2016-August 2017

Louisiana Tech University, Ruston, LA

Research Assistant Professor, Biological Microfluidic Lab, September 2014-August 2016
Project 1: Solid-phase gene extraction method for mRNA purification from low cell number.
Project 1: Lab-on-a-chip technology for assessing radiation induced genetic mutation.

BioSense Labs, LLC, Ruston, LA

Co-Founder, April 2015- December 2016
Microfluidic technologies for microRNA analysis and pathogen surveillance.

Bioventions, LLC, Ruston, LA

Scientist I, June 2012- June 2013
Project: Microfluidic platform for DNA sequencing.

Stanford University, Stanford, CA

Research Assistant II, Human Immune Monitoring Center, January 2007-February 2009
Project 1: Genetic mechanism of *Arabidopsis* in response to environmental stress
Project 2: Transcriptome alteration of diabetic heart and its effect on increased risk of cardiac death

RESEARCH INTERESTS

- Solid phase technology for direct purification of mRNA and extracellular vesicles
- Lab-on-a-chip technologies for genomic and proteomic research
- Microfluidic technologies for ultrasensitive detection of miRNAs
- MicroRNA regulation of DNA repair

TECHNICAL SKILLS

- DNA sequencing, PCR, high-resolution melting analysis
- Design and fabrication of microfluidic devices
- Gene expression, methylation and miRNA microarray technology
- Enzyme-linked immunosorbent assays

- Functionalization and immobilization of biological molecules
- Capillary Electrophoresis with laser induced detection (CE-LIF)
- Confocal microscope, scanning electron microscope (SEM), atomic force microscope (AFM)

GRANTS

- NASA EPSCoR International Space Station (ISS) Flight Opportunity (Science-I): One-step sampling tool to improve the ISS Bioanalytical Facility. \$99,992. 01/01/2019-12/31/2021.
- LaSPACE REA (PI): Exploring long-term chemistries for genetic analysis in space. \$64,979. 09/01/2018-05/31/2020.
- LaSPACE Research Enhancement Award Program (REA) (PI): Exosomal microRNA expression as biomarkers for assessment of radiation-induced neurological injury. \$34,230. 09/01/2018-02/29/2020.
- LaSPACE LURA (PI): Effect of radiation on mitochondrial mass and oxidative activity. \$6,000. 09/01/2018-08/31/2019.
- LaSPACE LURA (PI): Effect of high-energy radiation on the formation of 8-hydroxydeoxyguanosine. \$6,000. 09/01/2018-08/31/2019.
- Louisiana Board of Regents Research Competitiveness Subprogram (RCS) (PI): ExoSense: Lab-on-a-chip Platform for Solid-Phase Purification of Exosomes. \$131,835. 06/2018-06/2021.
- LaSPACE LURA (PI): Effect of radiation on the rate of mitochondrial DNA damage and repair, \$6,000. 09/2017-08/2018.
- Board of Regents Support Fund Superior Graduate Fellows in Molecular Sciences and Nanotechnology 2016-2021 (Co-PI). \$100,000. 08/2016-07/2021. PI: Dr. Ramu Ramachandran,
- NSF SBIR Phase I and IB (PI): Thermoelectric DNA Sequencer for Mutation Detection, award #1141957, \$175,000. 01/2012-12/2012.

PUBLICATIONS SUMMARY

- **13** research papers in peer-reviewed journals
- **1** book chapter
- **26** conference presentations, abstracts and acknowledged paper contributions
- **9** grants (PI or Co-PI)
- **2** provisional patent
- **2** report of invention

INTELLECTUAL PROPERTY DISCLOSURE

1. **G. G. Nestorova**, “Thermoelectric ELISA Method for Detection of Nucleic Acid, RNA, and Bacteria Cells”, provisional patent, serial number 62/268, 941, filed 12/17/15 by Louisiana Tech University.
2. **G. G. Nestorova**, “Thermoelectric ELISA Method for Detection of Nucleic Acid, RNA, and Bacteria Cells”, Report of Invention #2015-05 filed with Louisiana Tech University Office of Intellectual Property and Commercialization May 2015.
3. **G. G. Nestorova**, “Thermoelectric Method for Performing ELISA”, provisional patent, serial number 62/107,613, filed 1/26/15 by Louisiana Tech University.
4. **G. G. Nestorova**, “Thermoelectric Method for Performing ELISA”, Report of Invention #2013-19, filed with Louisiana Tech University Office of Intellectual Property and Commercialization, December 2013.

PEER REVIEWED JOURNAL PAPERS

5. S. M. I. Bari, L. Reis, and **G. G. Nestorova**, Calorimetric sandwich-type immunosensor for quantification of TNF- α . *Biosensors and Bioelectronics*. 2019; 126:82-87.

6. **G. G. Nestorova**, K. Hasenstein, N. Nguyen, M. A. DeCoster and N. D. Crews, Lab-on-a-chip mRNA purification and reverse transcription via a solid-phase gene extraction technique. *Lab on a chip*. 2017; 17(6): 1128-36.
7. **G. G. Nestorova**, B. S. Adapa, V.L. Kopparchy and E. J. Guilbeau. Lab on a Chip Label-free DNA Biosensor for Detection of Nucleic Acid Sequence. *Sensors and Actuators B: Chemicals*. 2016; 225: 174-80.
8. **G. G. Nestorova**, N. D. Crews, and E. J. Guilbeau. Theoretical and experimental analysis of thermoelectric lab-on-a-chip ELISA. *Microfluidics and Nanofluidics*. 2015; 19(4): 963-72.
9. **G. G. Nestorova**, V.L. Kopparchy, N. D. Crews, and E.J. Guilbeau. Thermoelectric lab-on-a-chip ELISA. *Analytical Methods*. 2015;7 (5):2055-63.
10. L. Shi, E. J. Guilbeau, **G. G. Nestorova**, and W. Dai. A mathematical model and numerical method for thermoelectric DNA sequencing. *Heat and Mass Transfer*. 2014; 50(5): 1–17.
11. C. Zhang, **G. G. Nestorova**, R. A. Rissman, and J. Feng, Detection and quantification of 8-hydroxy-2'-deoxyguanosine in Alzheimer's transgenic mouse urine using capillary electrophoresis. *Electrophoresis*. 2013; 34 (15): 2268-74.
12. V. L. Kopparchy, S. M. Tangutooru, **G. G. Nestorova**, and E. J. Guilbeau, Thermoelectric microfluidic sensor for bio-chemical applications. *Sensors and Actuators B: Chemical*. 2012; 166: 608-15.
13. S. M. Tangutooru, V. L. Kopparchy, **G. G. Nestorova**, and E.J. Guilbeau., Dynamic thermoelectric glucose sensing with layer-by-layer glucose oxidase immobilization. *Sensors and Actuators B: Chemical*. 2012; 166: 636-41.
14. **G. G. Nestorova**, and E. J. Guilbeau, Thermoelectric Method for Sequencing DNA. *Lab on a Chip*. 2011; 11 (10): 1761-69.
15. S. M. Tangutooru, V. L. Kopparchy, R. Gumma, **G. G. Nestorova**, and E. J. Guilbeau., Dynamic Thermoelectric Microfluidic Glucose Sensing with layer-by-layer Glucose Oxidase Immobilization. *International Journal of Medical Implants and Devices*. 2011; 5 (2): 66.
16. J. Walley, D. Kelley, **G. G. Nestorova**, D. Hirschberg, and K. Dehesh, Arabidopsis deadenylases AtCAF1a and AtCAF1b play overlapping and distinct roles in mediating environmental stress responses. *Journal of Plant Physiology*. 2010; 152 (2): 866-75.
17. K. D. Wilson, Z. Li, R. Wagner, P. Yue, P. Tsao, **G. G. Nestorova**, M. Huang, D. Hirschberg, P. Yock, T. Quartermoust, and J. Wu, Transcriptome Alteration in the Diabetic Heart by Rosiglitazone: Implications for Cardiovascular Mortality. *PLoS ONE*. 2008; 3(7): e2609.

BOOK CHAPTER

18. **G. G. Nestorova**, Thermoelectric Lab-On-A-Chip Technologies: Design, Applications, Challenges, and Future Trends, *Advances in Engineering Research*. 2017; (19), Ed. Victoria M. Petrova, Publisher: Nova Science Publishers, Inc.,

CONFERENCE PAPERS AND ABSTRACTS

19. D. Gaines, R. Ledbetter, N.D. Crews, G.G. Nestorova, One-step nucleic acid sampling technology for genetic analysis on the International Space Station, *2019 Space Summit*, Coronado, CA.
20. C. D. Nwokwu, S. M. I. Bari, G. G. Nestorova, Microprobe-based platform for rapid immunocapture and genetic analysis of exosomes, *2019 Circulating Biomarkers Congress*, Coronado, CA.
21. S. M. I. Bari, L. G. Reis, G. G. Nestorova, Microfluidic calorimetric immunosensor: experimental results and COMSOL simulations of heat transfer in microchannel, *APS 2019 March Meeting*, Boston, MA.
22. C. D. Nwokwu, S. M. I. Bari, G. G. Nestorova, Platform for Solid-Phase and Antigen-Specific Purification of Exosomes, *35th Southern Biomedical Engineering Conference (SBEC)*

23. S. M. I. Bari, L. G. Reis, G. G. Nestorova, Lab-on-a-chip thermoelectric immunoassay for detection of TNF- α : experimental results and COMSOL simulations of heat transfer, *35th Southern Biomedical Engineering Conference (SBEC)*
24. K. H. Hutson, C. D. Nwokwu, K. M. Willis, C. Vazquez, K. H. Hutson, G. G. Nestorova, Identification of miRNA-OGG1 mRNA interactions: small RNA sequencing and immunoprecipitation analysis, *LaSPACE Council Fall Meeting*, Shreveport, LA, 2018.
25. K. M. Willis, C. D. Nwokwu, K. H. Hutson, G. G. Nestorova, Effect of high-energy radiation on mitochondrial DNA copy number changes and 8OHdG levels in human astrocytes, *LaSPACE Council Fall Meeting*, Shreveport, LA, 2018.
26. S. M. Bari, G.G. Nestorova, Lab-on-a-chip immunoassay for thermoelectric quantification of TNF- α , *34th Southern Biomedical Engineering Conference (SBEC) MAS 2018*; 63:132, suppl.1. Presenting author.
27. K. H. Hutson, K. M. Willis, A. Y. Xiao, L. Harrison, **G. G. Nestorova**, Identification of novel miRNAs that regulate OGG1 mediated DNA repair, *LaSPACE Council Fall Meeting*, Baton Rouge, LA, 2017
28. S. M. Bari, **G. G. Nestorova**, Lab-on-a-chip thermoelectric ELISA for detection of TNF- α , *Industry day conference*, Shreveport, LA, 2017.
29. K. H. Hutson, K. M. Willis, A. Y. Xiao, L. Harrison, **G. G. Nestorova**, Identification of novel miRNAs that regulate OGG1 mediated DNA repair, *Industry day conference*, Shreveport, LA, 2017.
30. K. Willis, **G.G. Nestorova**, OGG1 role in oxidative stress induced DNA damage and repair, 2017 *ANS Research Symposium*, Louisiana Tech University, LA, 2017.
31. T. Pham, M. Hamideh, K. Willis, and **G. G. Nestorova**, Lab-on-a-chip thermoelectric ELISA technology for quantitation of TNF- α , 2017 *ANS Research Symposium*, Louisiana Tech University, LA.
32. **G.G. Nestorova**, K. Hasenstein, and N.D. Crews, Lab-on-a-chip-mediated RNA extraction via steel solid phase gene extraction probes, *LaSPACE Council Fall Meeting*, Ruston, LA, 2016.
33. **G.G. Nestorova**, K. Hasenstein, N. Nguyen, M. DeCoster, N. D. Crews. Lab-on-a-chip mediated RNA purification from 3D cell spheroids via solid-phase gene extraction technique, *2016 ASME Meeting*, Washington, DC, 2016. Presenting author.
34. D. Jana, D. Saint Jean, S. Abdurakhimov, V. Koppaarthi, **G.G. Nestorova**, N. Pal, N. Nguyen, P. Derosa, L. Sawyer, N. Crews, and M. DeCoster, Genetic Assessment of the Space Environment using MEMS Technologies, *2016 APS March meeting*, Baltimore, MD, 2016. Presenting author.
35. **G.G. Nestorova**, K. Hasenstein, and N.D. Crews, Lab-on-a-chip-mediated RNA extraction via steel solid phase gene extraction probes, *Industry day*, LSUHS-Shreveport, LA, 2015.
36. **G.G. Nestorova**, N.D. Crews, and E.J. Guilbeau, Mathematical Simulations of Heat transfer and Fluid Dynamics in a Microfluidic Calorimeter with Integrated Thin-film Thermopiles, *2014 Annual Fall Meeting of the BMES*, San Antonio, TX, 2014.
37. **G.G. Nestorova**, V.L. Koppaarthi, S.M. Tangutooru, R. Gumma, and E.J. Guilbeau, Effect of Hydrodynamic Focusing on Increased Sensitivity of Thermoelectric Method for DNA Sequencing, *2011 Annual Fall Meeting of the BMES*, Hartford, CT, 2011.
38. V.L. Koppaarthi, S.M. Tangutooru, R. Gumma, **G.G. Nestorova**, and E.J. Guilbeau, Highly Sensitive Continuous Flow Micro-calorimeter for Biological Applications, *2011 Annual Fall Meeting of the BMES*, Hartford, CT, 2011.
39. **G.G. Nestorova**, V.L. Koppaarthi, S.M. Tangutooru, R. Gumma, and E.J. Guilbeau, Thermoelectric method for sequencing by synthesis, *Lab-on-a-chip World Congress*, San Francisco, CA, 2011.
40. **G.G. Nestorova**, V.L. Koppaarthi, S.M. Tangutooru, R. Gumma, and E.J. Guilbeau, Thermoelectric method for sequencing by synthesis, *Louisiana Academy of Science 85th Annual Meeting*, Monroe, LA, 2011.

41. S.M. Tangutooru, R. Gumma, V.L. Koppa, **G.G. Nestorova**, and E.J. Guilbeau, Fabrication and Characterization of Highly Sensitive Thin-Film Thermopiles, *Louisiana Academy of Science 85th Annual Meeting*, Monroe, LA (2011).
42. S.M. Tangutooru, V.L. Koppa, R. Gumma, **G.G. Nestorova**, E.J. Guilbeau, Dynamic Thermoelectric Glucose sensing with Layer-by-layer Glucose Oxidase Immobilization, *SBEC 27th Annual Meeting*, Arlington, TX, 2011.
43. J. Feng, C. Zhang, S. Wang, H. Xia H, B. Hollins, G. Chen, J. Spaulding, M. Circu, C. Rodriguez, **G.G. Nestorova**, M. Decoster, K. Murray, S. Soper, and T.Y. Aw, Monitoring Protein Oxidative damage in aging and Alzheimer's disease, *LBRN 9th Annual Meeting*, Shreveport, LA, 2011.
44. V.L. Koppa, S.M. Tangutooru, R. Gumma, **G.G. Nestorova**, and E.J. Guilbeau, Characterization of Microfluidic calorimeter for measuring small dynamic temperature changes, *2010 BMES Annual meeting*, Austin, TX, 2010.
45. **G.G. Nestorova**, C. Zhang, and J. Feng, Quantitative determination of 8OHdG in Alzheimer transgenic mice urine using capillary electrophoresis with laser induced fluorescence detection, *SFRBM 17th Annual Meeting*, Orlando, FL, 2010.

ACKNOWLEDGED CONTRIBUTIONS

46. Shen-Orr, S., Tibshirani, R., Khatri, P., Bodian, DL et al., Cell type-specific gene expression differences in complex tissues. *Nature Methods* 7, 287 – 289 (2010).
47. Pespeni, M., Oliver, T., Manier, M., and Palumbi, S., Restriction Site Tiling Analysis: accurate discovery and quantitative genotyping of genome-wide polymorphisms using nucleotide arrays. *Genome Biology* 11: R44 (2010).

MENTORING

Graduate students (chair)

- 2019-present Kristen Hutson, M.S. Molecular Sciences and Nanotechnology
 2018-present Deriesha Gains, Ph.D. Engineering Micro and Nanoscale Systems
 2017-present Saif Mohamad Ishraq Bari, Ph.D. Engineering Micro and Nanoscale Systems
 2017-2018 Saif Mohamad Ishraq Bari, M.S. Molecular Sciences and Nanotechnology
- 2018 CBERS research scholarship recipient
 - 2019 CBERS research scholarship recipient
- 2017-present Chukwumaobim Daniel Nwokwu, Ph.D. Molecular Sciences and Nanotechnology
- Best oral presentation award in 2018 Louisiana Tech University COES Research Symposium

Graduate students (committee)

- 2019-present Mengcheng Liu, Ph.D. Molecular Sciences and Nanotechnology
 2019-present Haley Barnett, Ph.D. Molecular Sciences and Nanotechnology
 2019-present Navya Uppu, Ph.D. Molecular Sciences and Nanotechnology
 2019-present Charles Nicolasvu, Ph.D. Molecular Sciences and Nanotechnology
 2018-present Yaswanthi Yanamadala, Ph.D. Molecular Sciences and Nanotechnology
 2018-present Morgan Nall, M.S. Molecular Sciences and Nanotechnology
 2018-present Rebecca Hodnett, M.S. Biology
 2018-present Victor Ojo, Ph.D. Molecular Sciences and Nanotechnology
 2018-present Andrew Roser, Ph.D. Molecular Sciences and Nanotechnology
 2016-2019 Zilong Li, Ph.D. Computational Analysis and Modeling
 2016-present Yue Li, Ph.D. Biomedical Engineering
 2017-present Sreelakshmi Venigalla, Ph.D. Molecular Sciences and Nanotechnology
 2017-present Chris Miller, Ph.D. Molecular Sciences and Nanotechnology
 2017-present Neela Parajapati, Ph.D. Biomedical Engineering
 2017-present Shauna Tranter, M.S. Engineering

2017-2019 Nam Nguen, PhD Biomedical Engineering
2017-2019 Hannah Green, M.S. Engineering Biomedical Engineering
2017-2018 Nam Nguen, M.S. Molecular Sciences and Nanotechnology
2017-2018 Urna Kansakar, M.S. Molecular Sciences and Nanotechnology
2016-2017 William Grimes, Ph.D. Molecular Sciences and Nanotechnology

Undergraduate students

2019-present Eric Thomas, B.S. Biology
2019-present Thomas Holland, B.S. Biomedical Engineering
2019-present Raye Ledbetter, B.S. Chemistry

- Senior design project: Immobilization of oligo capture probes for solid-phase purification of RNA

2018-2019 Parker Willmon, B.S. Biomedical Engineering
2016-present Kaitlynn Willis, B.S. Biology

- LaSPACE LURA 2017-2018
- LaSPACE LURA 2018-2019
- 2019 featured ANS student
- Recipient of 2017 and 2018 ANS undergraduate research mini-grant

2017-2019 Kristen Hutson, B.S. Biology

- 2018 ANS undergraduate research mini-grant
- LaSPACE LURA 2018-2019

2017-2019 Carolina Vazquez, B.S. Biology
2016-2017 Mohamad Hamideh, BS Biomedical Engineering

- 2017 CBERS research scholarship

2016-2017 Tatiana Pham, B.S. Biomedical Engineering

- 2017 CBERS research scholarship

TEACHING

- Biotechnology principles (MSE 512, BISC 450C, BISC 516C, MSNT 657, MSNT 510)
- Graduate endocrinology (BISC 406, BISC 506, MSNT 510, MSNT 657)
- Protein analysis (BISC 492, BISC 592, MSNT 510, MSNT 657)
- Extracellular Vesicles in Research and Diagnostics (BISC 535)
- Doctoral enhancement seminar (MSNT 611)
- Molecular sciences and nanotechnology seminar (MSNT 504)

REVIEWER

- ASC Sensors
- Cell Biochemistry and Biophysics
- NeuroReport
- Heliyon